The Management of Super, Natural British Columbia[1]

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Superabundance of natural resources attracted European settlers to British Columbia in the early nineteenth century. Before then, native Indians had lived here for thousands of years, developing a lifestyle and culture that was greatly influenced by these natural resources. Within the following century, the province's population increased to a million people and the settlers developed a thriving economy based on the forest, mineral, fisheries, agricultural, hydro power and recreational resources of the province. Slowly at first but with increasing frequency in the last twenty years, major conflicts have emerged between resource users, and it has become questionable how much longer the increasing rates of resource exploitation can be sustained.

In the 1970s, political conflict over the environment emerged as a major issue in British Columbia, as it did throughout the world. Concerns which had existed for many years about the conservation of natural resources and the control of pollution suddenly took on a new and far-reaching significance. In part this was a result of the increasingly blatant evidence — often in the form of smog and polluted lakes and rivers — of the detrimental consequences of unrestrained economic growth. These impressions were reinforced by scientific studies of less obvious problems that suggested damage to ecosystems and human health could be much greater than previously appreciated (for example, evidence of how the pesticide DDT was accumulating in animal and human tissue).[2] Other studies, such as *Limits to Growth* (Meadows et al., 1972), predicted that, if left unchecked, pollution could impose limits on economic growth long before resources began to run out. At the same time, an increasingly prosperous society became more interested in health and in recreational activities that were dependent on the preservation of environmental

[1] I am most grateful to Christopher Gibbs, Bev Jaffray, Jon O'Riordan, Mark Sproule-Jones, Brahm Wiesman and a referee for comments and suggestions on an earlier draft.

[2] Public attention was drawn to these effects by Rachel Carson in her book *Silent Spring* (1962).

quality. All of these factors contributed to heightened political conflicts and led to the emergence of environmental management as a major issue in the seventies.

This paper focuses on the environmental conflicts that have emerged in British Columbia and assesses the public policies that have been developed to resolve them. The first section outlines the evolution of provincial policy to manage the environment. It focuses on the major innovations of the New Democratic Party government between 1972 and 1975 and the subsequent adaptations of those initiatives by the Social Credit Party governments, culminating in major contraction following their re-election in 1983. The influence of federal policy is then briefly summarized before making an assessment of provincial environmental management during the last twenty years. The paper concludes by proposing the major changes that will be necessary if the environment is to be managed effectively and efficiently in an era of restraint.

I

THE EVOLUTION OF PROVINCIAL POLICY

Under the British North America Act of 1867, the Province owns the natural resources of environmental concern — land, minerals, water and wildlife, including fish — and they are subject to provincial management and sale (Thompson, 1981).[3] During the first hundred years after British Columbia joined Canada, provincial policy was strongly oriented to the promotion of an economy based on the exploitation of these resources. Legislation and government departments were designed primarily to promote and facilitate development (see figure 1). The major natural resources legislation evolved from the original versions of the Land Act (1875), the Water Act (1909), the Mineral Act (1878), the Forests Act (1912), the Game Act (1873) and the Provincial Fisheries Act (1901).

During this first century, environmental conflicts were treated primarily as incidental issues and were addressed under a variety of sub-sections of these acts. The early wildlife legislation focused on game and later sport fisheries management and treated pollution control and habitat management as incidental problems. Public health concerns associated with water supply and sanitary wastes disposal were addressed in the Health Act

[3] These rights continue today under the Constitution Act (1982). However, federal rights and responsibilities with respect to natural resources have important implications for provincial discretion in environmental management.

(1888) and subsequent related legislation, which were the forerunners of the pollution control policies of recent years.

The Introduction of Pollution Control — Late Sixties

With the acceleration of urban and industrial development in the post-war years, pollution problems became more serious and extensive. In response to this, the B.C. Pollution Control Act was introduced in 1967.[4] It established the Pollution Control Branch in the Water Resources Service of the B.C. Ministry of Lands, Forests and Water Resources. Under this legislation, discharges to the land and water were required to be registered with the Branch and to have either a permit or the approval of the Branch Director. A Pollution Control Board was also established to prescribe effluent and ambient standards as well as hear appeals of the Director's decisions. In 1971 the legislation was extended to include discharges to the atmosphere. Between 1970 and 1973 five public inquiries were held to recommend environmental objectives for the Forest Products, Mining and Milling, Food Processing and miscellaneous industries, the Petro-chemical industry, and the disposal of municipal wastes. Between 1976 and 1980 three of these were reassessed in a further set of inquiries, and revised objectives were set by the Board.

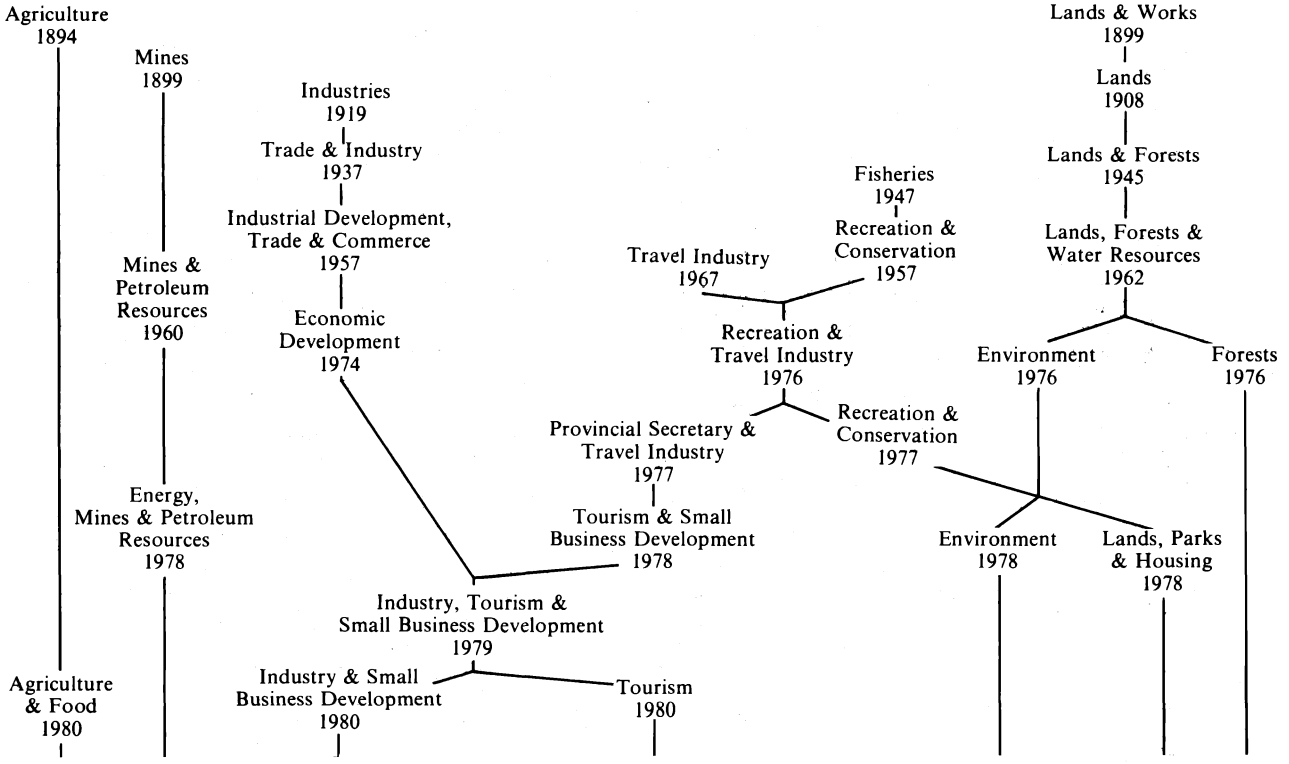
A Pesticide Control Branch and an associated Pesticide Control Appeal Board were established in 1978 to regulate the sale, use, transport, storage and disposal of pesticides. In the following year the Pollution Control Branch was renamed the Waste Management Branch to reflect the increasing emphasis being given to control of waste generation and to recycling (recovery of waste oils, for example). An Air Management Branch was also established, reflecting the increasing importance attached to management of air quality. In 1982 these changes were elaborated and consolidated in a new Waste Management Act, and an omnibus Environmental Appeal Board was established to replace the previous pollution and pesticide control boards.[5]

[4] A Pollution Control Act had been introduced in 1956, but it was limited to municipal effluent and the Fraser River. It established a Pollution Control Board in the Department of Municipal Affairs. See Lucas (1969) and Sproule-Jones (1980) for analyses of early water pollution control legislation in B.C.

[5] The pollution control activities of the provincial government are numerous and complex, and have undergone many changes in the last twenty years. This paper only selectively highlights these activities; for detailed information see the annual reports of the relevant government departments, particularly the Water Resources Service (1967-1975), the Department of Recreation and Conservation (1967-1977) and the Ministry of Environment (1976-1985).

FIGURE 1

Provincial Government Organization of Departments for Conservation, Development and Promotion of Natural Resources



SOURCE: Morley et al. (1983, p. 136).

The Arrival of Environmental Impact Assessments — Early Seventies

Accelerated development in the post-war years produced increasing problems in controlling not only pollution but also wildlife habitat destruction and degradation. In 1971 the Environment and Land Use Act established an Environment and Land Use Committee (ELUC) of Ministers from all the major natural resource-using departments, to resolve conflicts in the development of land and other resources. The ELUC was chaired by the Minister of Lands, Forests and Water Resources, and initially included the Ministers of Agriculture, Mining and Petroleum Resources, Recreation and Conservation, Economic Development, Health, Highways and Municipal Affairs. The Committee was given the power to override any other Act or regulation by the Environment and Land Use Act.

In 1973 the newly elected New Democratic Party government added a Secretariat to facilitate co-ordination between departments and to undertake investigations to serve the needs of the ELUC. Before its dissolution in 1980, the ELUC Secretariat developed and implemented a four-stage process for assessing the impacts of major projects such as hydro power dams, transmission lines, new highways and mine developments. The four stages of assessment began with review of project justification, followed by broad evaluation of alternative development sites, detailed evaluation of a selected site, and finally impact mitigation and compensation during and following project implementation. The first major assessment, in 1974, was of B.C. Hydro's proposed dam on the Pend-d'Oreille River, and it resulted in B.C. Hydro being ordered for the first time to pay the B.C. Fish and Wildlife Branch compensation for losses of wildlife habitat. As experience was gained with a succession of projects, guidelines were issued to guide proponents and their consultants as to the steps to be taken in seeking government approvals and the information appropriate to each approval.[6]

Until 1980 there was no broadly based legislation providing for public hearings to consider project assessments. During the last half of the seventies, the primary opportunity (and then only for water projects) was the hearing conducted by the Water Comptroller to consider an application for a water licence under the Water Act. As these hearings were expanded to consider not only environmental but also socio-economic impacts, they were found to be increasingly inadequate — the

[6] For detailed information on the activities of the ELUC Secretariat, see the annual reports (1974 and 1975) and subsequent chapters in the Ministry of Environment and annual reports (1976-1979).

hearings in 1976 for B.C. Hydro's Revelstoke dam being a prime example (Bankes and Thompson, 1981). As a result of this experience, and with the prospect of a large number of energy-related projects, the B.C. Utilities Commission Act was introduced in 1980. The recently completed two-year inquiry into B.C. Hydro's proposed Site C project on the Peace River was one of the first projects to be submitted to this new, more comprehensive process (Henry, 1983). Provisions for an inquiry, contained in the 1981 Environmental Management Act, provide an additional but more limited opportunity for hearings that potentially could be used for any type of project. It has recently been employed for the first time to conduct a six-week inquiry into the proposed Quinsam coal mine on Vancouver Island (Hillier et al., 1983).

The Inception of Resource Planning — Mid Seventies

The ELUC Secretariat also initiated integrated regional development and natural resource management studies, beginning with case studies in the Burns Lake-Smithers area, the Purcells and Whistler Mountain, and going on to the Northeast and Southeast coal block studies. The province was divided into seven Resource Management Regions (RMRs), and all resource agencies were to shift their regional headquarters to common centres over a three-year period.[7] Regional Resource Management Committees (RRMCs) comprising representatives from each of the relevant regional ministries were established in each region to co-ordinate activities and to initiate integrative studies (ELUC Secretariat, 1975).[8]

Stimulated in part by these innovations, each of the resource departments began to develop planning processes as a basis for management. The creation of the Agricultural Land Reserves program in 1973 prompted each sector to consider protection of its resource base. Following the 1975 Royal Commission on Forest Resources, which recommended integrated planning of activities on forest lands, the Ministry of Forests introduced a regionalized planning process for all the regions in the province. This has been the basis for designating Provincial Forests, lands on which the primary use would be timber production, and for integrating all uses of forest lands. The Ministry of Lands, Parks and

[7] The RMRs and their centres were as follows: Vancouver Island, Nanaimo; Lower Mainland, Greater Vancouver; Thompson-Okanagan, Kamloops; Kootenay, Nelson; Cariboo, Williams Lake; Omineca-Peace, Prince George; and Skeena, Smithers.

[8] The Skeena RMR experimented with a one-person secretariat to the RRMC; although considered a success, it was not extended to all regions (Heayn, 1977).

Housing has developed a comparable planning process for other crown lands.[9]

The development of planning processes for environmental resources was part of several major changes in the organization of government departments (see figure 2). In 1975 the newly elected Social Credit government created a provincial Department of Environment from the Land and Water Resources Services, as well as a separate Department of Forests. A succession of subsequent reorganizations and expansions have greatly expanded the department, which was renamed a Ministry in 1977. The most significant changes were the absorption of the ELUC Secretariat (1977), the addition of the Fish and Wildlife Branch and the Marine Resources Branch (1978) and the removal of the Land Management Branch to the new Ministry of Lands, Parks and Housing (1978). In 1979 the Ministry of Environment began to regionalize its operations into eight regions to handle its expanding programs more effectively.[10] At the same time, building on the earlier initiative of the ELUC Secretariat, it embarked on a process of strategic planning, to provide a coordinated framework for province-wide environmental policies based on regional implementation. The eight RMRs were subdivided by drainage basins into some forty Strategic Planning Units. It was intended that a plan for each unit would be completed as soon as possible using readily available information, and then it would be refined and revised over time. Once completed, the plans would provide the necessary basis for formulation of regional and provincial policies, and in particular they would provide the required link to operational decisions and preservation of the resource base.[11]

Contraction of Assessment, Planning and Management — Early Eighties

The momentum of reorganization and innovation was sustained into the beginning of the eighties by the expectation of numerous megaprojects and a thriving resource economy. But suddenly the bubble burst, and in two years there was a major contraction in the environmental assessment, planning and management activities of the provincial government. The already shrinking growth rate in energy demand was compounded by the world-wide recession, and the consequences showed up

[9] See Dorcey et al. (1980) for a discussion of these and other related planning processes.

[10] The original seven ELUC Secretariat regions (RMRs) were increased to eight by separating the Okanagan and Thompson regions.

[11] For a discussion of the strategic planning process, see O'Riordan (1981).

in a diminishing list of new projects to be assessed: many were first postponed and then cancelled. One of the most graphic examples was the change in outlook during the course of the Utilities Commission hearings on the Site C dam: by the end of the hearings, the project had been put off so far into the future that it was no longer clear whether it would even be the next best development in B.C. Hydro's system (Henry, 1983).

Stimulated by the consequences of the recession and by a belief that government had grown too large and interventionist, in 1983 the newly re-elected Social Credit government introduced a budget and new legislation that included measures to reduce the role of government in natural resources management. The RRMCs were abolished, the regional planning responsibilities of Regional Districts were removed, the number of RMRs was reduced from eight to five, and within one year the staff of the Ministry of Environment was reduced by thirty percent. (In later sections of this paper, the effect of those changes on the effectiveness of environmental management is assessed.)

II

THE INFLUENCE OF FEDERAL POLICY

The constitutional basis for federal involvement in environmental management is not as comprehensive and specific as it is for the provinces, but it is nevertheless significant, particularly so in the case of British Columbia. The federal government's major powers stem from its jurisdiction over "sea coast and inland fisheries" and international relations and from the residual power of Parliament to legislate for "peace, order and good government." Utilization of these powers during the last twenty years has had a major influence on the evolution of provincial policy.[12]

Setting the Pace — Mid Sixties to Mid Seventies

Federal initiatives beginning in the second half of the sixties were an important stimulus to the development of environmental management policy in British Columbia in the seventies.[13] The Canada Water Act

[12] See Thompson (1981) for an analysis of the use of these powers in environmental management.

[13] The Canadian initiatives were in turn stimulated by greatly expanded planning and research activities for water resource management and, later, environmental regulation in the United States; see discussion in Dorcey (1986a).

(1970) provided for federal-provincial agreements in undertaking co-operative river basin planning and management. One of the first agreements was the Okanagan River Basin Study begun in 1972. The Act also provided for unilateral action to be taken by the federal government if agreement could not be reached. However, this has never happened, in large part because of the expanded activities of the provinces.

Although administration and enforcement of federal control over inland fisheries were delegated to the Province in 1901, the larger responsibility for regulation of the major Pacific salmon fisheries and protection of their habitats has provided the basis for a large federal role in environmental management in British Columbia. Beginning in 1970, regulations were developed on an industry-to-industry basis to establish effluent discharge standards. Implementation of pollution control was then left to the provinces as long as provincial standards were as stringent as the federal regulations.[14] In situations where the federal government desired more stringent regulation, it could use the threat of prosecution under the Fisheries Act to negotiate compliance. Protection of fish and fish habitat was also implemented directly using sections of the Act. These provisions were strengthened in 1970 and again in 1977. In the latter amendments, the definition of "fish" was broadened to include "eggs," and "fish habitat" extended to embrace all habitats that affect fish (Dorcey et al., 1980).

In 1973 the federal cabinet created the Environmental Assessment and Review Process (EARP) to determine environmental impacts and recommend controls for any project involving federal lands or funds. One of the first projects to be reviewed under the EARP was the proposed expansion of the Vancouver International Airport in the Fraser River estuary. The studies and public meetings conducted under this and subsequent EARPs have strongly influenced the development of provincial impact assessment processes.[15]

By the mid-seventies, these federal initiatives, together with the formation of the Department of the Environment in 1970 (which was expanded into the Department of Fisheries and Environment in 1972), had set a new pace for environmental management on the West Coast.[16]

[14] Although other provinces signed formal protocols with the federal government, this was not achieved in British Columbia.

[15] Other projects submitted to the EARP in British Columbia include the Roberts Bank Port Expansion, the Fraser River Shipping Channel, the Prince Rupert Port Expansion, and the CN Rail Twin Tracking Program.

[16] For a more detailed discussion of many of these initiatives, see Thompson (1981).

Withdrawal and Regrouping — Mid Seventies to Early Eighties

In the late seventies the federal pace faltered, in part because of the major provincial initiatives but also because of disappointing experiences with their own earlier initiatives. The innovative river basin studies conducted under the Canada Water Act were found to be expensive, lengthy and without clearly demonstrable benefits. With the onset of fiscal restraint, federal matching funds for these studies began to be reduced, and the studies became more limited.[17] As the economy deteriorated, industry questioned the justification of the increasing costs of environmental regulation.[18] In British Columbia, first the forest industry and then Alcan challenged in the courts, with some success, certain fish habitat protection regulations.[19] Experience with the EARP in British Columbia and particularly in northern Canada proved to be highly unsatisfactory to almost all parties involved (Rees, 1981). The process was further discredited as it became evident that it was not being applied consistently to all potential projects.

Also during this period, new natural resource and environmental management issues emerged to complicate and distract from the earlier initiatives. Energy, forestry and fisheries crises have arisen successively and have presented major problems of resource development and conservation that have so far defied any easy or ready solution. Toxic pollutants and acid rain have emerged as pervasive and highly complex pollution concerns that necessitate international regulation. Water export and climatic change are equally challenging issues that are now in prospect.[20]

Even though there had not yet been any concerted attempt to reduce the federal budgets for environmental management, the experiences and emergence of new issues in recent years left federal policy on the West Coast in disarray. Since 1977 the Department of Fisheries and Oceans and Environment Canada have been separate. The Department of Fisheries and Oceans was preoccupied with extreme difficulties in the rationalization of the West Coast fishery, proving the questionable success of

[17] These conclusions are elaborated in Brule et al. (1981).

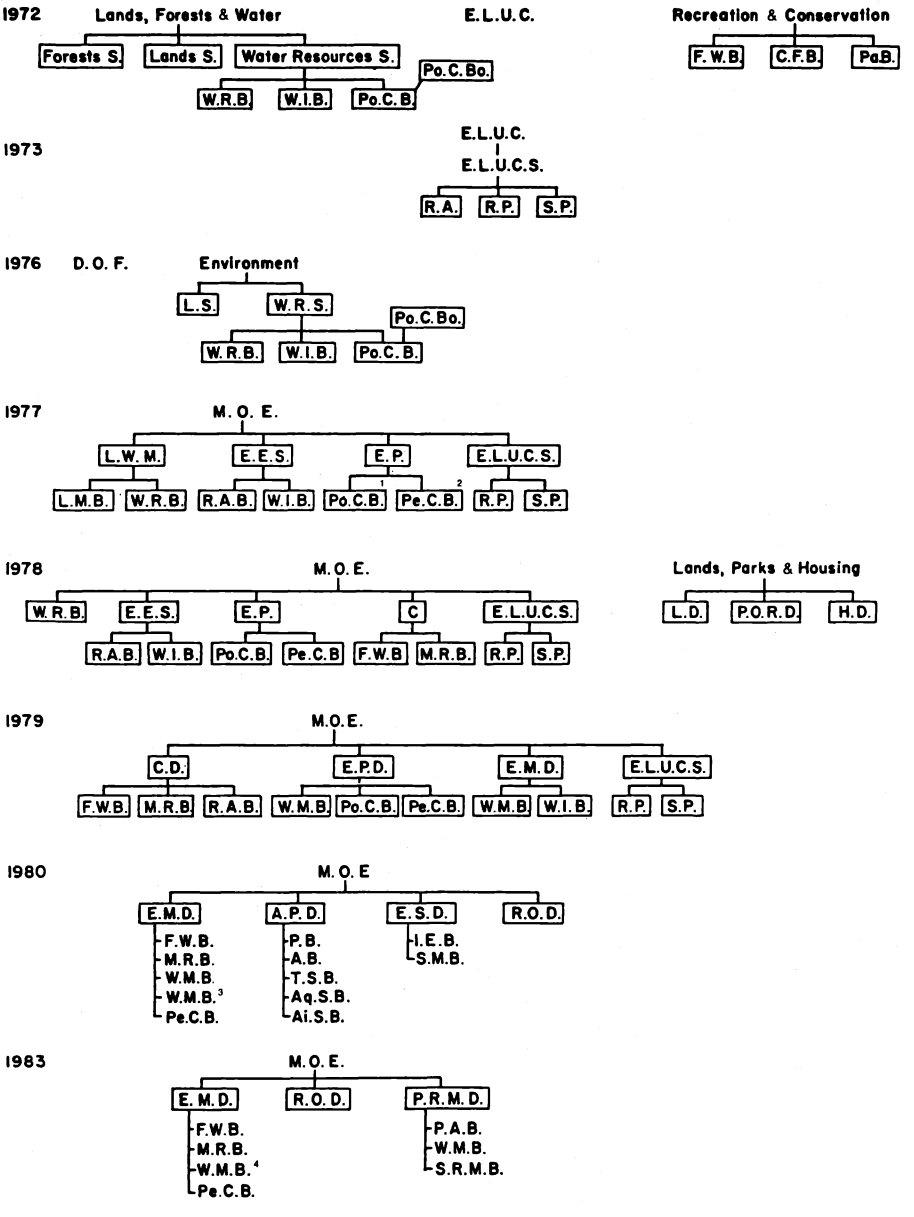
[18] These concerns were in part responsible for the Regulation Reference to the Economic Council of Canada from the First Ministers' conference in 1978. Thompson (1981) reviews these arguments and the results of studies that were undertaken to determine their validity.

[19] The *Fowler* case and the *Alcan* case are both described in Thompson (1981).

[20] An overview of these environmental management problems and the issues they raise is provided in Environment Canada (1983).

FIGURE 2

Organization of Major Branches of Provincial Government Responsible for Management of the Environment Key Changes 1972-1984



W.R.B.	Water Rights Branch
W.I.B.	Water Investigations Branch
Po.C.B.	Pollution Control Branch (and Board Po.C.B.)
F.W.B.	Fish and Wildlife Branch
C.F.B.	Commercial Fisheries Branch (later M.R.B.)
Pa.B.	Parks Branch
R.A.	Resource Analysis Unit
R.P.	Resource Planning Unit
S.P.	Special Projects Units
L.W.M.	Land and Water Management
E.E.S.	Environmental and Engineering Services
E.P.	Environmental Protection
L.M.B.	Land Management Branch
Pe.C.B.	Pesticide Control Branch (and Board Pe.C.B.)
M.R.B.	Marine Resources Branch
L.D.	Lands Department
P.O.R.D.	Parks and Outdoor Recreation Department
H.D.	Housing Department
C.D.	Conservation Division
E.P.D.	Environmental Protection Division
E.M.D.	Environmental Management Division
R.O.	Regional Operations
A.P.D.	Assessment and Planning Division
E.S.D.	Environmental Services Division
R.O.D.	Regional Operations Division
P.B.	Planning Branch
A.B.	Assessment Branch
T.S.B.	Terrestrial Studies Branch
Aq.S.B.	Aquatic Studies Branch
Ai.S.B.	Air Studies Branch
I.E.B.	Inventory and Engineering Branch
S.M.B.	Surveys and Mapping Branch
P.R.M.D.	Planning and Resource Management Division
P.A.B.	Planning and Assessment Branch
S.R.M.B.	Surveys and Resource Mapping Branch
1. & 2.	Also the Boards of each
3.	Waste Management Branch (previously Po.C.B.)
4.	Environmental Appeal Board (Replaces Po.C.B. and Pe.C.B.)

the Salmonid Enhancement Program and, in the last few years, attempting to revitalize habitat management.[21] Without the Fisheries Act, Environment Canada has had to rely on the relatively narrow basis of the Environmental Contaminants Act for its major legislative mandate for pollution control in southern Canada.[22] Environment Canada recently cut back significantly the size of its Lands Directorate, and there is growing demand for the removal of the Canadian Forest Service to a separate department. This disarray in federal policy has to be a major concern, given the Province's decision to reduce its own involvement in environmental management.

III

CRITERIA FOR EVALUATING MANAGEMENT

Today, environmental management in British Columbia is a highly complex bargaining process (Dorcey and Thompson, 1983). It involves many different actors: politicians and civil servants from all levels of government; employees of the resource extraction and processing industries; environmental and conservation groups; consultants; university researchers; and many individual citizens. These actors meet in many different forums to bargain over the quality of the environment to be maintained in British Columbia. Thus on any one day one might see the following bargaining activities going on: the B.C. Minister of Environment negotiating with his federal counterpart an agreement for a joint review of regulation of offshore oil exploration; his Deputy Minister meeting with executives from a coal company and the federal Department of Fisheries and Oceans to explore a compromise over compensation for lost fish habitat; an intergovernmental task force finalizing a plan for logging one coastal island in exchange for designating another as an ecological reserve; a public meeting being held to obtain reactions to the proposed plan for accommodating forestry, grazing, wildlife and sports fisheries in an interior region; a fisheries biologist negotiating with a forest company manager to relocate a new road further from a stream; a

[21] These issues are examined in the Report on Pacific Fisheries Policy by Pearse (1982).

[22] The Environmental Contaminants Act (1975) provides for the identification and control of toxic substances; see Nemetz et al. (1981) for an analysis of its implementation and the role of associated federal regulation.

Conservation Officer visiting a small electroplating plant to discuss progress in reducing its waste discharge; and so on.

To evaluate these environmental management processes, three criteria will be used:[23]

1. Representation criterion: Is there adequate opportunity for informed participation or representation of affected interests in the bargaining processes?
2. Information criterion: Is there adequate information about the range of choice and the consequences of environment and natural resource uses, in terms relevant to the interests involved?
3. Cost-effectiveness criterion: Are the institutional arrangements for generation of information and representation of interests cost-effective?

IV

AN ASSESSMENT OF PROVINCIAL ENVIRONMENTAL MANAGEMENT[24]

Representation Criterion

Under the momentum of the NDP initiatives, opportunities for interests to participate in environmental management expanded greatly in the seventies. This was particularly the case for the bargaining processes within government. The proliferation of referral arrangements among branches for all types of permits (such as waste discharge permits), licences (such as Tree Farm Licences) and leases (such as foreshore leases) increasingly provided opportunities for branches in all four levels of government to learn of new developments and to become involved in decisions about the regulation of their environmental effects. Slowly these processes became formalized in guidelines. The ELUC Secretariat initiatives led to the widespread use of task forces and committees to bring

[23] For an elaboration of these criteria, the principles of Canadian governance and theory upon which they are based, and their application in natural resources management, see Fox et al. (1983) and Dorcey (1986b).

[24] This section utilizes studies conducted by Westwater that have applied the three evaluative criteria to a variety of environmental and natural resource management issues in British Columbia. For more detailed analyses see Sproule-Jones (1980) on water pollution control in the lower Fraser River; Dorcey et al. (1980) on forestry-fishery conflicts; Thompson (1981) on environmental management in Canada; Dorcey (1981) on management of the Fraser River estuary; and Dorcey (1983 and 1986b) on coastal resources management in British Columbia.

together relevant interests from all four levels of government to resolve particular environmental issues. Task forces were struck to undertake small technical studies (for example, the resource folios for forest cut plans), to address small problems (for example, selecting a site for a hazardous waste disposal facility), and to resolve conflicts in small areas (for example, the Cowichan estuary study). The establishment of the RRMCs was a major innovation because they created the essential mechanism for participation in management decisions that were becoming increasingly decentralized during the seventies. With the dissolution of the ELUC Secretariat in the last years of the decade, a number of interministerial committees emerged to carry on some of its functions.

Opportunities for participation by interests outside of government in these bargaining processes have also increased significantly. There are provisions for public participation in many of the permitting, licensing, leasing, impact assessment and resource planning processes. These opportunities may be limited to appeals of decisions (as in the issuance of waste discharge permits), or may be more extensive and involve opportunities to submit briefs (as in B.C. Utilities Commission hearings), to be consulted (as in the strategic planning process of the Ministry of Environment) or, occasionally, to be actively involved in planning (as in the citizen task force in the Okanagan River Basin Study). In a few instances, public involvement has been assisted by the provision of services (the Fraser River Estuary Study is one example) and in one case — the Site C hearings — by funding intervenors.

In spite of the improvements in opportunities for participation, serious weaknesses have remained because of inadequate communication and accountability in the management system that evolved. The accountability of the elected decision-maker to the electorate and, in turn, of the civil servant to the elected decision-maker is fundamental to Canadian principles of parliamentary government. Neither the basis for political representation nor the procedures for accountability have been adapted to the much-expanded, more open and decentralized bargaining processes for management of the environment. The concentration of political responsibility in the provincial cabinet and the greatly expanded requirement for political decisions have severely tested the capability to give informed consideration to all issues. This has been further frustrated by the complexity of the issues and the poor communication of them by analysts.[25]

[25] See the studies cited in footnote 24 for specific examples and also the report of the Auditor General on the Pollution Control Branch (Morrison, 1982).

Information Criterion

During the last decade, there has been a great increase in the quantity of data available to describe the environment and the resource users in British Columbia. Major investments have been made in inventories and monitoring (such as wildlife surveys and stream gauging), in the development of computerized data bases and in interpretative mapping of resource capability, sensitivity and suitability. A substantial proportion of this information has been developed in the process of assessing proposed developments, and often it has been funded by private companies (for example, Alcan's fish and wildlife studies for the Kemano Completion Project).

Methods of analysis have been significantly improved. Chemical and biological analyses have been greatly refined by their extensive use in environmental impact assessments. The many project reviews have led to new developments in assessment techniques for socio-economic as well as environmental impacts. In particular, standardized procedures have been developed for cost-benefit and compensation analyses.[26] In the last few years these techniques have begun to be adapted to meet the particular needs of strategic planning (O'Riordan, 1985).

It is in the regional supply and demand analyses which are fundamental to strategic planning that major weaknesses in the information generated over the last decade have been most starkly revealed.[27] There has been a disproportionate emphasis on physical and biological data as opposed to socio-economic data. For example, the species of fish in a certain lake may be known, but typically little is known about the demand for the sport fishery. Further, while there have been large quantities of data collected, there has been much less progress in developing an understanding of how the physical, biological and socio-economic systems function. As a result, key cause-effect relationships remain poorly understood. For example, in spite of a huge increase in data about the Fraser River estuary, there is still enormous uncertainty about the effect of waste discharges and habitat destruction on the survival of salmon stocks.[28]

Cost-Effectiveness Criterion

The weaknesses in information make it very difficult to assess the cost-effectiveness of the management of super, natural British Columbia in

[28] For a detailed analysis of this example see Dorcey and Hall (1981).

[26] See Loose (1979).

[27] See references cited in footnote 24 and O'Riordan (1981).

terms of changes in the environment. Historical data usually do not exist to indicate conditions before development. Data collected more recently have not been designed to monitor the state of the provincial environment, and are collected on too fragmented a spatial or temporal basis for this purpose. The continuing controversies over the status of chinook salmon populations, wolf populations, and water quality conditions in the Fraser River all reflect this uncertainty. There is, however, a pervasive perception that pollution and habitat degradation are becoming at least more widespread and perhaps also more serious even with the much-expanded environmental management activities of government.[29]

The bargaining processes of environmental management have not been as effective as they could potentially be.[30] Poorly informed participants have frustrated the bargaining processes. This is evident in two-party negotiations between pollution control agencies and waste dischargers (Sproule-Jones, 1980), between habitat management agencies and resource developers such as the forest industry (Dorcey et al., 1980), and, even more so, in the multi-party negotiations involved in the management of complex situations like the Fraser River estuary (Dorcey, 1981). These weaknesses have persisted in large part because research has not been targetted on the critical gaps in knowledge about resource systems (Dorcey and Hall, 1981). More fundamentally, the frustrated negotiations reflect the participants' lack of bargaining skills.[31] Few of the participants, the majority of whom have been educated in the natural and applied sciences, have had experience in bargaining. The lack of appropriate political guidance and accountability procedures have further exacerbated the difficulties in the bargaining. Without political leadership these processes cannot function: the management process in the Fraser River estuary has languished for seven years because of this failure (Dorcey, 1981).

It is not easy to measure the governmental costs of environmental management because of the many branches involved and the changes in them since the early seventies. However, a good estimate can be made for the provincial government from the data on revenue and expenditures

[29] Evidence of this perception is provided by statements made at public hearings — Site C, Quinsam Coal — and in the media.

[30] Dorcey and Thompson (1983) argue that these bargaining processes have the potential to be highly effective and suggest the variety of changes required to realize the potential.

[31] Dorcey and Thompson (1983) apply the concepts of "principled bargaining" proposed by Fisher and Ury (1981) to demonstrate what is required in environmental management.

summarized in table 1 and figure 3.[32] It is immediately obvious that before the expansion of environmental management activities in the seventies, revenues from fish, game and water licences were greater than expenditures on management of these environmental resources. Until the eighties, revenues grew more slowly than expenditures. Since then, water rates have been increased greatly by the Social Credit government, and revenues have leaped to more than three times expenditures.[33]

During the NDP government, environmental expenditures increased at an average of 29 percent per year, compared with 39 percent per year for total government expenditures (see figure 4).[34] During the subsequent Social Credit governments, environmental expenditures increased at 8 percent per year, compared with 18 percent per year for total government expenditures.[35] Thus, under the Social Credit governments, the rate of increase in environmental expenditures has dropped from 75 percent to 44 percent of the average increase in total government expenditures. In real terms, expenditures reached an all-time high in the final year of the NDP government; since then, they have been at most 92 percent of that high (in 1979) and by 1982 had declined to 77 percent of the all-time high.

V

NEW DIRECTIONS: FROM CONTRACTION TO INCREASED PRODUCTIVITY

In the seventies, we only began to learn how to manage the environment in B.C. The task has proven to be large, complex and complicated

[32] This discussion of revenues and expenditures is limited to the provincial government and does not consider comparable information for federal and local governments; nor does it estimate costs incurred by the private sector. For a discussion of the difficulties in estimating costs and effectiveness of environmental management and selected case examples, see Thompson (1981) and the associated reports of Economic Council of Canada (1981).

[33] Expenditures reported under "Fish and Wildlife" and "Water Resources" in the Public General Fund Expenditure Accounts include a large proportion of the environmental management expenditures of the provincial government. Since the consolidation of these expenditures in the Ministry of Environment they can be compared with the Ministry's total expenditure: 1980 — $49.9 million and $71.1 million; 1981 — $49.7 million and $81.7 million; 1982 — $55.8 million and $89.2 million.

[34] Environmental expenditures (estimated as the sum of "Fish and Wildlife" and "Water Resources") increased from $20.4 million to $38.1 million between 1973 and 1976. At the same time, total General Fund Expenditures increased from $1,595 million to $3,442 million.

[35] From 1976 to 1982, environmental expenditures increased from $38.1 million to $55.8 million and total General Fund Expenditures increased from $3,442 million to $7,087 million.

TABLE 1

Changes in Government Income and Expenditures by Fiscal Year
($Millions)

YEAR:	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
ESTIMATED ENVIRONMENTAL EXPENDITURES[1]													
Current Dollars:	2.8	3.9	3.4	5.3	4.6	10.5	15.7	20.4	20.4	21.1	29.6	38.1	36.3
Constant 1972 Dollars[2]:	4.3	5.7	4.7	7.0	5.7	11.9	16.9	20.4	19.1	18.2	21.9	24.4	20.5
ESTIMATED ENVIRONMENTAL REVENUES[3]													
Current Dollars:	4.1	4.3	4.5	4.7	5.6	6.4	6.9	7.3	8.8	10.7	11.7	16.5	18.0
Constant 1972 Dollars:	6.3	6.3	6.2	6.2	6.9	7.2	7.4	7.3	8.2	9.2	8.7	10.6	10.1
TOTAL GENERAL FUND EXPENDITURES													
Current Dollars:	508.	645.	660.	759.	911.	1177.	1200.	1397.	1595.	1987.	2690.	3442.	3558.
Constant 1972 Dollars:	782.	949.	904.	999.	1125.	1338.	1290.	1397.	1491.	1713.	1993.	2206.	2010.
TOTAL GENERAL FUND REVENUES													
Current Dollars:	561.	657.	732.	814.	968.	1180.	1300.	1480.	1691.	2133.	2680.	3032.	3652.
Constant 1972 Dollars:	863.	966.	1002.	1071.	1195.	1341.	1398.	1480.	1580.	1839.	1985.	1944.	2063.
IMPLICIT PRICE INDEX FOR GOVERNMENT EXPENDITURES													
	65	68	73	76	81	88	93	100	107	116	135	156	177

YEAR:	1978	1979	1980	1981	1982	1983	1984	1985
ESTIMATED ENVIRONMENTAL EXPENDITURES								
Current Dollars:	39.5	47.3	49.9	49.7	55.8	49.8	66.3	n.a.
Constant 1972 Dollars:	20.4	22.4	21.7	19.1	18.8	14.6	19.1	n.a.
ESTIMATED ENVIRONMENTAL REVENUES								
Current Dollars:	20.1	21.0	21.3	41.2	71.5	198.3	182.9	216.0[4]
Constant 1972 Dollars:	10.4	10.0	9.3	15.8	24.1	59.5	52.7	60.2
TOTAL GENERAL FUND EXPENDITURES								
Current Dollars:	4021.	4469.	5140.	6277.	7087.	7513.	8364.	9056.[4]
Constant 1972 Dollars:	2073.	2118.	2235.	2414.	2386.	2256.	2410.	2522.
TOTAL GENERAL FUND REVENUES								
Current Dollars:	4225.	4641.	5604.	5905.	6903.	6529.	7344.	8166.
Constant 1972 Dollars:	2179.	2200.	2437.	2271.	2324.	1961.	2116.	2275.
IMPLICIT PRICE INDEX FOR GOVERNMENT EXPENDITURES (1972=100)								
	194	211	230	260	297	333	347	359[5]

NOTES:

1. Environmental expenditures estimated as sum of "Fish and Wildlife" and "Water Resources" in General Fund Expenditures, B.C. Public Accounts.
2. 1972 Dollars based on Implicit Price Index for Government Expenditures in Statistics Canada Catalogue No. 13-001, National Income and Expenditures Accounts.
3. Environmental revenues are sum of "Fish and Wildlife" and "Water Resources" in General Fund Revenue Accounts, B.C. Public Accounts.
4. Forecast values reported in1985 Budget.
5. Mean of first two quarters of 1985.

FIGURE 3

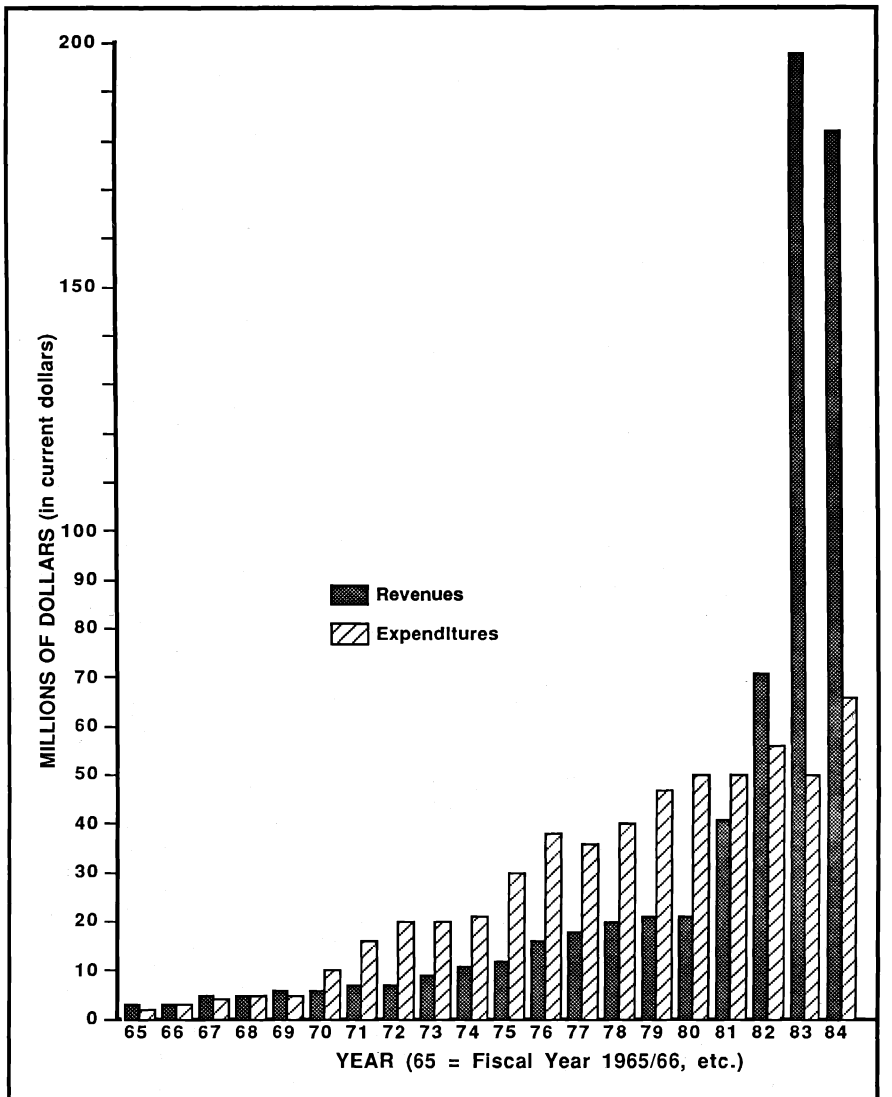


FIGURE 3 - PROVINCIAL GOVERNMENT FISH, WILDLIFE AND WATER REVENUES AND EXPENDITURES, 1965 - 1984.
SOURCE: Based on information in Table 1.

by numerous uncertainties. It is thus hardly surprising that not all initiatives were successful. Emphasis should now be placed on capitalizing on the successes and learning from the failures. Despite the lack of information, it is clear that B.C. today is not quite as super, natural as it used to be. The state of British Columbia's natural resource assets is the bottom line in environmental management. Even though information is not available to be precise, it is evident that these assets are slowly being eroded. This is already starkly evident in the depletion of the wild salmon stocks and the old-growth coastal forests. The losses from habitat degradation are more piecemeal and insidious. Several changes in provincial government strategies will be required if management of the environment is to become more productive and, at the same time, adhere more clearly to the normative principles of Canadian government.

Structuring the Bargaining

Two structural changes could greatly improve the bargaining processes involved in establishing and implementing environmental policies. The first involves making elected politicians responsible and accountable. In the late twentieth century the number and diversity of issues to be resolved in a province as large and diverse as B.C. is too great for them all to be given informed consideration by provincial ministers (Morley et al., 1983). It will be essential to identify conflicts that can be better resolved in the regions. This would involve allowing issues to be bargained out wherever possible by elected politicians in regional districts and municipalities. It would also mean identifying the policies required to ensure representation of the provincial interest in regional decision making. This restructuring has the advantage of allowing provincial ministers to focus their efforts where they are most relevant and effective, while at the same time improving the participation and representation of interests in the bargaining process. To ensure these benefits are realized, it is essential to create appropriate accountability mechanisms. The acceleration of the strategic planning processes and the development of bargaining skills, as outlined below, are the central requirements for improving accountability.[36]

The second structural change involves creating better opportunities for bargaining within this more hierarchically organized management pro-

[36] For more specific and detailed examples of the implementation of these changes, see Dorcey et al. (1980) for the management of forestry-fishery conflicts, Dorcey (1981) for the management of the Fraser River estuary, and Dorcey (1983 and 1986b) for the management of B.C.'s coastal resources.

cess. There are many opportunities to resolve conflicts more quickly and effectively by selectively establishing forums and incentives to bargain them out at appropriate local, regional and provincial levels.[37] The agreement on compensation and mitigation between Dome Petroleum and the Port Simpson Indian band, negotiated without government involvement, is a good example of these possibilities. To be productive, it would be essential that these forums allow for participation of the appropriate interests and that the participants have confidence that the outcome would be considered legitimate by all parties.

These two structural changes imply that important reallocations in responsibilities are essential to increased productivity. First, selected responsibilities are devolved from senior to more junior governments. Second, elected politicians are made more responsible and the civil service more accountable. Third, within the framework of improved accountability, greater responsibility is given to industry to manage resources[38] and to all non-governmental organizations and individuals with interest in the management of the environment.[39] It is striking that the restraint measures introduced by the Social Credit government — in particular the centralization of decision making and the reductions in the strategic planning programs that are essential to improved accountability — are the opposite of what is required for increased productivity. In addition, if resource management responsibilities are shifted to the private sector, as proposed for forestry, while reducing the capability to ensure accountability to the government department, the reduction in productivity of environmental management will likely be compounded.

Informing the Bargaining

Generating information that permits more informed bargaining not only would make existing environmental management processes more productive but also would be essential to capture the full benefits of the restructured processes proposed above. To be an effective participant in the bargaining process, it is necessary to be informed about environmental management options that would not only be in your best interests; it

[37] Dorcey and Thompson (1983) elaborate on, and give examples of, this change.

[38] Dorcey et al. (1980) suggest how the forest industry could productively take on greater management responsibilities.

[39] A detailed proposal by Dorcey et al. (1983) for allowing non-governmental organizations and individuals to manage conservation areas on the West Coast exemplifies this approach.

would also be necessary to know how these would be affected by concessions made to other parties to the bargaining.[40]

Three changes will be necessary if this is to be achieved. First, strategic planning for environmental management must be developed in government and in industry. The strategic planning begun by the B.C. Ministry of Environment should be accelerated so that a hierarchy of policies can be developed for the province, regions and planning units.[41] Since these plans will take time to produce and require different types of information, an iterative approach should be taken to their development and refinement (O'Riordan, 1985). Resource development industries should be encouraged to expand their own strategic planning to develop comparable information. In both cases, the objective of strategic planning would be to be better informed about who benefits and who pays for the management options of interest to each.

Second, procedures must be developed for focusing research on the highest priority policy issues.[42] Improving knowledge of the functioning of relevant physical, biological, social and economic systems will be critical to success in strategic planning — without such information, no party can predict the consequences of its actions. Since the task is large and progress on many systems will be slow, priorization of efforts in both the public and private sectors will be most important if limited research capabilities are to be focused where they can be most productive.

Third, opportunities must be created for individuals to provide information directly to both planning and bargaining processes. Structured debate among individuals can be a highly effective and efficient process for generating technical and value information.[43] To ensure comparable effectiveness and efficiency in the contributions from individuals outside of government and industry, it will be necessary to provide selective financial support.[44]

[40] Fisher and Ury (1981) argue that this is essential to successful bargaining; for examples of its application to environmental management in B.C. see the references in footnote 24.

[41] The overall success will also be dependent on other major sectors, such as forestry and energy, which must bargain with Environment, developing their own strategic planning processes.

[42] Research that should be given highest priority as well as research that could not help policy decisions except in the long term would be identified; see Dorcey and Hall (1981) for a specific analysis relating to ecological research priorities for management decision making in the Fraser River estuary.

[43] Arguments for this are discussed by Dorcey and Thompson (1983).

[44] Experience with the funding of intervenors in the Site C hearings is discussed by Henry (1983).

FIGURE 4

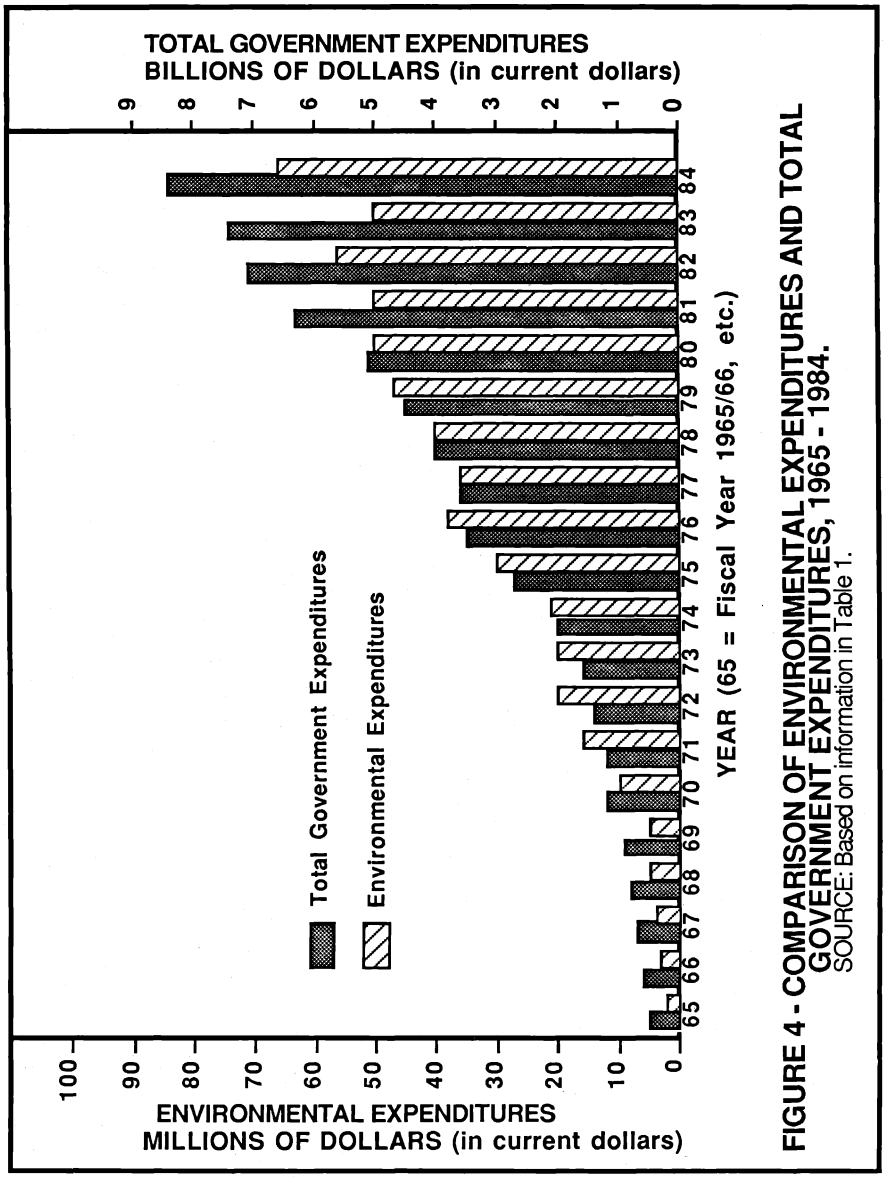


FIGURE 4 - COMPARISON OF ENVIRONMENTAL EXPENDITURES AND TOTAL GOVERNMENT EXPENDITURES, 1965 - 1984.
SOURCE: Based on information in Table 1.

These three sets of changes imply some important shifts in emphasis for governmental personnel and expenditures, irrespective of whether expenditures are further reduced or are increased. First, the mix of expertise needs to be altered: there should be a relative increase in economists, social scientists and strategic planners. Second, there needs to be a change in the mix of activities: there should be relatively less emphasis on inventory, monitoring and impact assessment and greater emphasis on strategic planning and policy-focused research.[45] Again, the recent restraint measures appear to ignore the type of changes required if productivity is to be increased: there is no evidence that the thirty percent reduction in manpower in the Ministry of Environment is being implemented with such changes in mind.

Funding the Bargaining

Is enough being spent by the provincial government on managing the environment? Recent public opinion surveys continue to indicate the surprisingly high priority given to the maintenance of super, natural B.C. A survey conducted for the Ministry of Environment in the late fall of 1982 found that only one percent of those surveyed had reduced their concern for the state of the environment because of the current state of the economy, only three percent felt the environment was over-regulated, and nearly fifty percent supported an increase in regulations to protect the environment (MacIntyre and Mustel Research Associates Ltd., 1982). Yet, as has been shown, government expenditures on management of the environment were declining in real terms and relative to other government expenditures even before the current restraint measures. Further, this has continued to happen despite greatly increased revenues from the management of environmental resources — revenues that are now more than double expenditures. There would seem to be good reason to question whether government expenditures on management of the environment adequately reflect the priorities of the public.

VI

CONCLUSION

In response to the growing demands in post-war years for use of natural resources in British Columbia, there have been major innovations in provincial management strategies. The bargaining processes of governance

[45] Specific examples are discussed in the references cited in footnote 24.

have been improved by expanding the opportunities for representation of interests and by becoming better informed. There are, however, significant weaknesses that will become more serious as the demands for use of natural resources diversify and grow still further. Two aspects are of particular concern. The first is the continuing lack of data and knowledge that would enable informed judgements to be made about the state and use of natural resources in British Columbia. The second is the debilitating effects on the productivity of the bargaining processes of governance from the recently introduced restraint measures. To increase the productivity of the governance system it will be necessary to restructure the process so as to strengthen political leadership and accountability through a more devolved process of bargaining; and to improve the generation of information through the development of strategic planning in both the public and private sectors, the establishment of processes for setting research priorities, and the creation of opportunities for direct involvement of knowledgeable interests in the more devolved bargaining processes. Ironically, these strategies for increasing the productivity of the management of super, natural British Columbia, which in many ways would be a continuation of those that were evolving through the seventies, imply moving in the opposite direction to restraint measures that were adopted in the name of greater cost-effectiveness in the early eighties.

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